Differentiating Between Military and Civilian-Associated IR Signatures via Movement Analysis Relative to Topography

25 March 2025
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Introduction

From the aerial perspective, it is often difficult to differentiate between civilians and military targets. Certain dimensions of military training, however, tend to cause military targets to move in ways which can positively identify them as such, allowing A.I. to assist in picking out valid military targets using drone- or satellite-based infrared sensors.

Abstract

With the aid of a detailed topographical map, an A.I., or a human, for that matter, may watch for signatures which move against the grain of the topographical map. Civilians will travel along established paths and roads, which tend to conform to topographical features, but for many reasons, military personnel will move against the grain of the natural topology of the land.

A Focus on Points of Entry onto Roads

Military vehicles, out of necessity, sometimes travel along roads. However, these vehicles, can be expected to move onto roads from points which are not traditionally used as segues onto roads, such as private driveways or even rural roads, but rather, arbitrary points along those roads. The availability of detailed information concerning not only the locations of commercial and residential driveways, but also historical data from the cellular devices of local inhabitants allow for certain entry-points onto roadways to be whitelisted so that vehicle movement onto roads from unusual points of entry may be flagged for analysis.

Clustering

Military units, if they are well-trained, will not cluster together, but will walk as a group with substantial spacing between them. This is not a pattern of movement which would be seen, typically, amongst civilians.

Differentiating Friend from Foe

A.I. is useful not only for analytical work, but for tracking large numbers of objects over indefinite periods of time, a feat not possible for even large teams of human analysts. Without requiring that friendly units transmit radio signals advertising their friendliness (along with their position,) A.I. may be used, in conjunction with orbital platforms, to track whitelisted objects (sc. vehicles) and whitelisted units. Units could be whitelisted before deployment

and tracked from their home base to prevent confusion with enemy units. Civilian assets could also be whitelisted.

By the same token, hostile units may be blacklisted by literally watching them continually from the time they leave their home base (perhaps hundreds of miles beyond the front lines) to the time they arrive at the front lines. Continual tracking of all objects is possible with a sufficient persistent observational capability when coupled with automated tracking.

Conclusion

An enemy able to anticipate the fielding of such a capability may try to visually occlude military units such as vehicles so that egress from home base is not immediately apparent to an A.I. Regardless, it could be anticipated that given this new capability, adversaries will soon follow suit and develop their own comparable capability. This capability requires either a proliferated LEO visual surveillance capability or, at minimum, a robust HEO geosynchronous capability featuring exquisite platforms.